

# ***SUN XXIV Tug Boat 1/20***

## ***Build instructions***



### ***Specifications***

|        |        |
|--------|--------|
| length | 720mm  |
| Width  | 180mm  |
| Height | 270mm  |
| Scale  | 1 / 20 |

### ***Requires***

|              |                                         |
|--------------|-----------------------------------------|
| RC equipment | RC transmitter with at least 2 channels |
| Servo        | 43g standard servo*1                    |
| Motor        | 380 Brushed motor                       |
| ESC          | 30A ESC for brushed motor               |
| Battery      | lipo 2s /LiFe/Pb battery                |

## **BEFORE YOU BEGIN**

### ***Attentions and Tips***

1. Read through the manual before you begin, so you will have an overall idea of what to do.
2. Check all parts. If you find any serious defects or missing parts, please contact your local dealer.
3. Please build your kit in strict accordance with the sequence of the user manual.
4. Pre-Sanding: Before removing any parts from the laser-cut plywood sheet, use a sanding block loaded with 250 - 400 grit sandpaper and lightly sand the back side of the sheet. Which can significantly reduce burn marks of the wood and make the parts match better
5. Before building the model part on drawings, It is recommended to cover a layer of kitchen cling film (polyethylene film) on the drawing. This way can prevent parts from sticking to the drawing and causing damage.
6. Parts Assembly: This product's tabs and notches interlock like a 3D puzzle. We strongly suggest that when fitting parts, you "dry fit" (use no glue) the parts together first. It is advised to work 1 - 2 steps ahead in the instructions, using this dry-fit technique. This allows the opportunity to inspect the fit and location of assembled components, and shows the benefits of our construction technique. As each successive part is added, it contributes to pulling the entire assembly square. Once you arrive at the end of a major assembly sequence, square your work on a flat work surface, and bond the dry-fit joints with glue. Using the dry-fit process, you'll be able to recover from a minor build mistake, and will ultimately end up with a square and true assembly.
7. This is a precision laser-cut kit. Our lasers cut to within 0.2mm in accuracy. Yet the wood stock supplied to us by the mill may vary in thickness by up to 0.2-0.3mm. This variance in the wood stock can cause some tabs and notches to fit very tightly. With this in mind, consider lightly sanding or lightly pinching a tight-fitting tab, rather than forcing the parts together. You may break some parts in assembly, but please don't worry, after the final covering work, it will not affect the strength and appearance of your model. You will end up with a circle and true airframe.



## KIT INVENTORY



### Sheet Wood Inventory

| Item:         | Quantity |
|---------------|----------|
| 1mm Plywood   | 2        |
| 2mm Plywood   | 5        |
| 3mm Plywood   | 2        |
| 5mm Balsa     | 3        |
| 1mm Paulownia | 2        |
| PVC windows   | 1        |

### Wood Strips Inventory

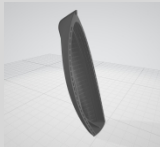
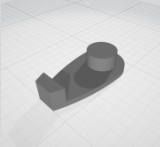
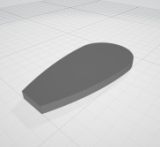
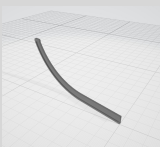
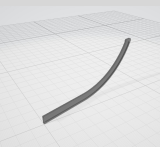
| Item:                                                 | Quantity |
|-------------------------------------------------------|----------|
| 1mm Paulownia for hull(Width:5mm, Length: about 50cm) | Ca.133   |
| 10mm diameter Bamboo rod for boat stand Length: 20cm) | 1        |

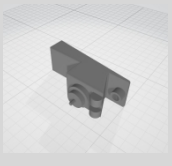
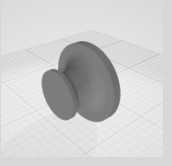
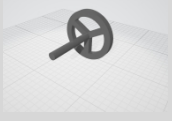
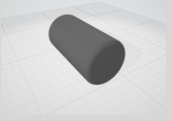
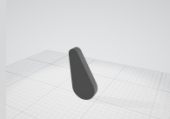
### Hardware in Wood Strips bag

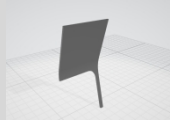
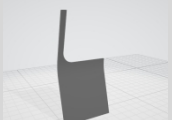
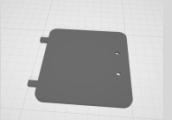
|                                               |   |
|-----------------------------------------------|---|
| Steel push rod(Diameter1.2mm,Length ca.72cm ) | 1 |
| ABS half cylinder(Length: 50cm)               | 4 |
| Copper Rod (Diameter :1mm, Length: 20cm )     | 1 |

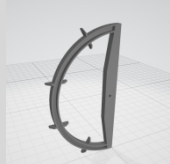
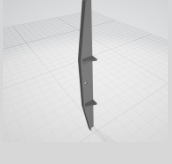
*TonyRay Aero Model Co.,Ltd Products*

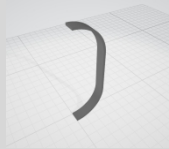
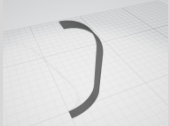
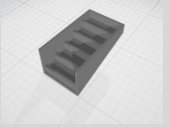
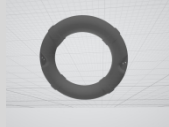
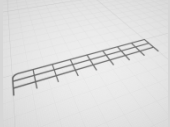
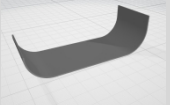
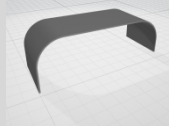
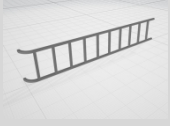
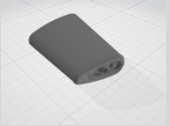
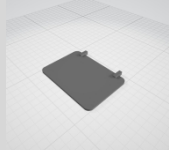
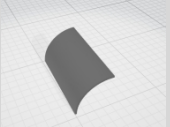
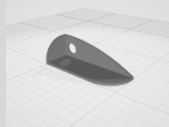
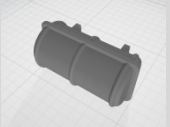
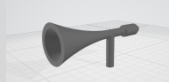
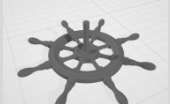
| <b>Hardware</b>                                                                                          |                 |                                                                                                      |                 |                                                                                                            |                 |
|----------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Item</b>                                                                                              | <b>Quantity</b> | <b>Item</b>                                                                                          | <b>Quantity</b> | <b>Item</b>                                                                                                | <b>Quantity</b> |
| M3*8 Screw<br>          | 4               | M3 Screw nut<br>    | 4               | M2*5 Screw<br>          | 2               |
| M2 Screw nut<br>        | 2               | Eye Screw<br>       | 20              | M2 L35MM stud<br>       | 1               |
| M1.2*4 Screw<br>        | 20              | Cotton Rope<br>     | Ca. 50cm        | Mental chain<br>        | Ca. 30cm        |
| Push rod connector<br> | 1               | Copper bell<br>    | 1               | Metal shaft system<br> | 1               |
| Copper ring<br>       | 1               | 3W LED Module<br> | 1               |                                                                                                            |                 |

| <b>Plastic parts</b>                                                                              |                 |                                                                                                       |                 |                                                                                                         |                 |
|---------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------------------------|-----------------|---------------------------------------------------------------------------------------------------------|-----------------|
| <b>1.Life Boat Module</b>                                                                         |                 |                                                                                                       |                 |                                                                                                         |                 |
| <b>Item</b>                                                                                       | <b>Quantity</b> | <b>Item</b>                                                                                           | <b>Quantity</b> | <b>Item</b>                                                                                             | <b>Quantity</b> |
| Life boat<br>  | 1               | Dummy Pulley-A<br> | 4               | Dummy Pulley-B<br> | 4               |
| Support -A<br> | 2               | Support -B<br>     | 2               |                                                                                                         |                 |

| <b>2.Anchor Winch module</b>                                                                         |          |                                                                                                      |          |                                                                                                        |          |
|------------------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------------------------------|----------|
| Item                                                                                                 | Quantity | Item                                                                                                 | Quantity | Item                                                                                                   | Quantity |
| Anchor<br>          | 1        | Anchor Winch -1<br> | 1        | Anchor Winch -2<br> | 1        |
| Anchor Winch -3<br> | 1        | Anchor Winch -4<br> | 1        | Anchor Winch -5<br> | 1        |
| Anchor Winch -6<br> | 1        |                                                                                                      |          |                                                                                                        |          |

| <b>3.Tool box room</b>                                                                        |          |                                                                                               |          |                                                                                                |          |
|-----------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------|----------|------------------------------------------------------------------------------------------------|----------|
| Item                                                                                          | Quantity | Item                                                                                          | Quantity | Item                                                                                           | Quantity |
| Roof-1<br> | 1        | Roof-2<br> | 1        | Hatch<br> | 2        |

| <b>4.Tow hook module</b>                                                                          |          |                                                                                                   |          |                                                                                                     |          |
|---------------------------------------------------------------------------------------------------|----------|---------------------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------|----------|
| Item                                                                                              | Quantity | Item                                                                                              | Quantity | Item                                                                                                | Quantity |
| Two hook-1<br> | 1        | Two hook-2<br> | 1        | Two hook-3<br> | 1        |

| 5.Accessories for deck construction                                                                     |                      |                                                                                                                     |                      |                                                                                                                          |                    |
|---------------------------------------------------------------------------------------------------------|----------------------|---------------------------------------------------------------------------------------------------------------------|----------------------|--------------------------------------------------------------------------------------------------------------------------|--------------------|
| Item                                                                                                    | Quantity             | Item                                                                                                                | Quantity             | Item                                                                                                                     | Quantity           |
| D6<br>                 | 1<br>(Thickness 2mm) | Rear edge of Deck construction<br> | 1<br>(Thickness 1mm) | Stairs<br>                            | 1                  |
| Life Ring<br>          | 1                    | Rear railing<br>                   | 1                    | Right railing<br>                     | 1                  |
| Left railing<br>       | 1                    | Ladder<br>                         | 1                    | Chimney<br>                           | 1                  |
| Hatch on chimney<br> | 3                    | Door<br>                         | 2                    | Front edge of Deck construction<br> | 2<br>(Left +Right) |
| Navigation light<br> | 2<br>(Left +Right)   | Rudder Horn<br>                  | 1                    | Water tank<br>                      | 1                  |
| Whistle<br>          | 1                    | Steering wheel<br>               | 1                    |                                                                                                                          |                    |

**Electronics pack (Included in Kit with full sets version)**

1. MG955 Servo



2.380 motor



3.ESC 30A



4. Cooling bushing



5.Universal connector



6.Metal motor bracket



7.Propeller

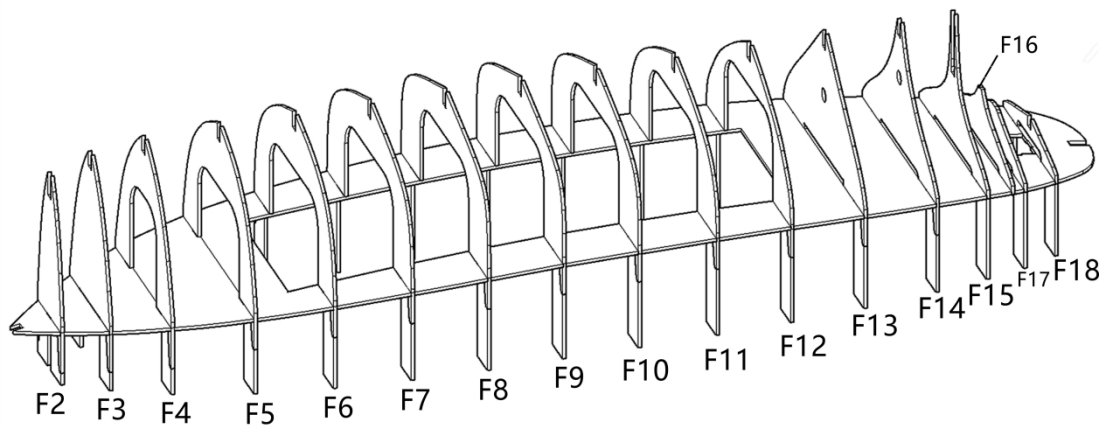


8.JST 2p Plug for motor

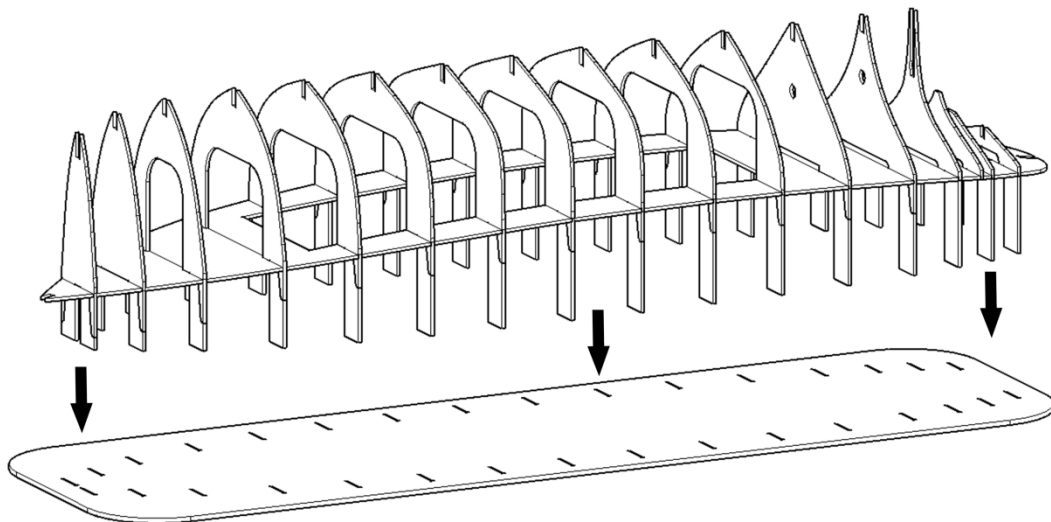


## Part1 - Hull

1.1 Please remain the jig when removing the bulkhead from wood sheet.

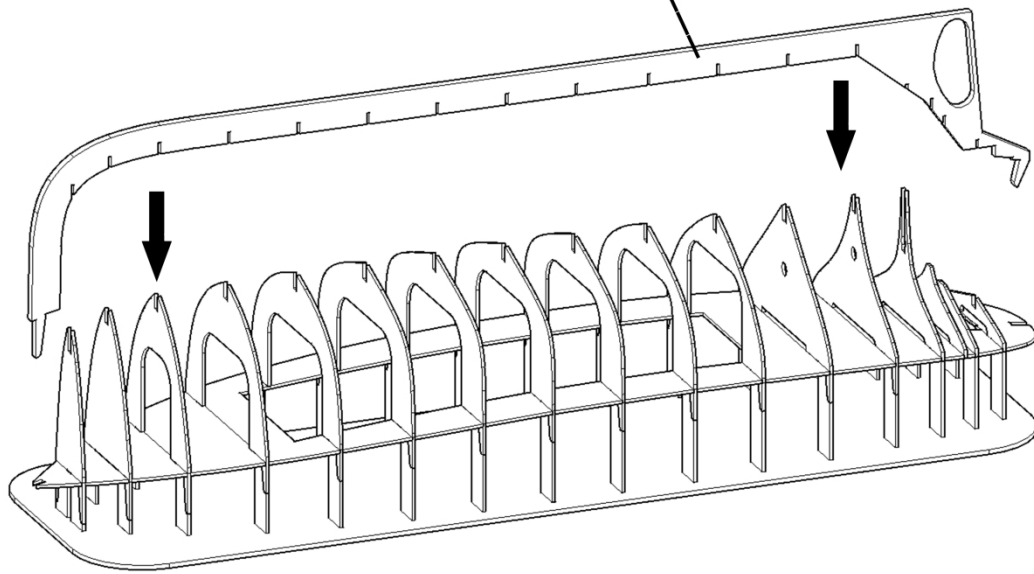


1.2

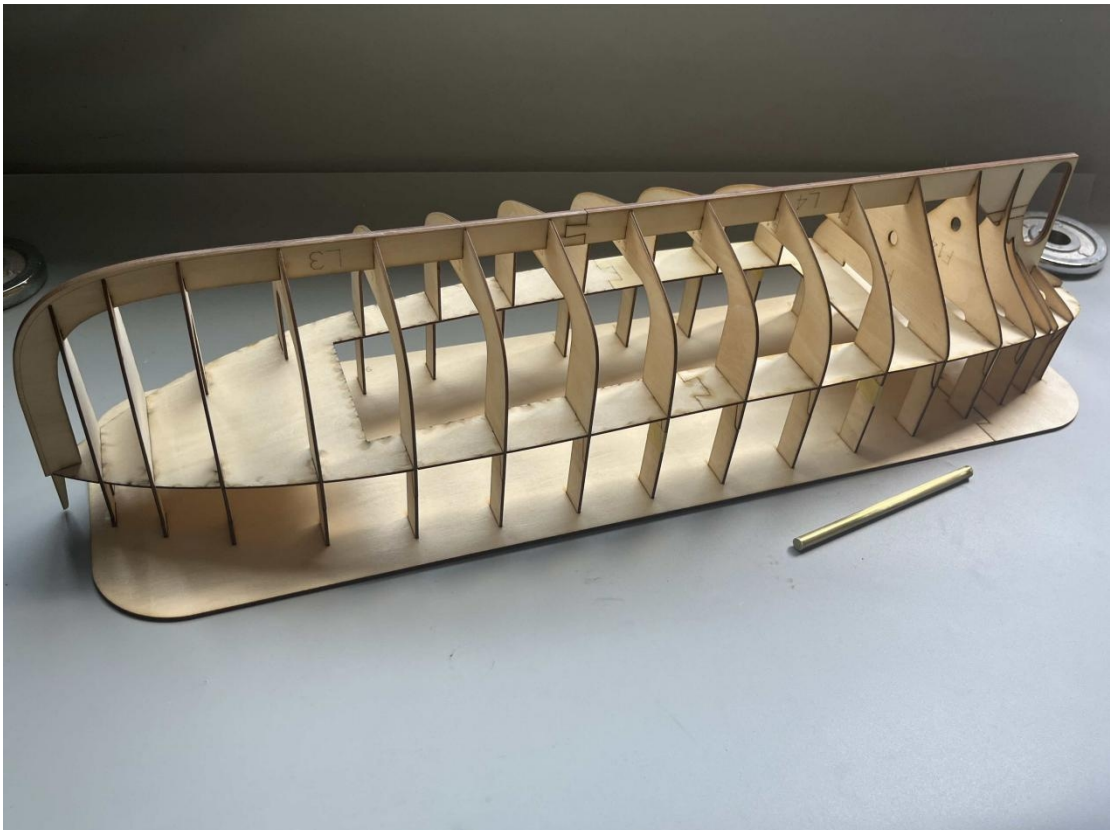


1.3

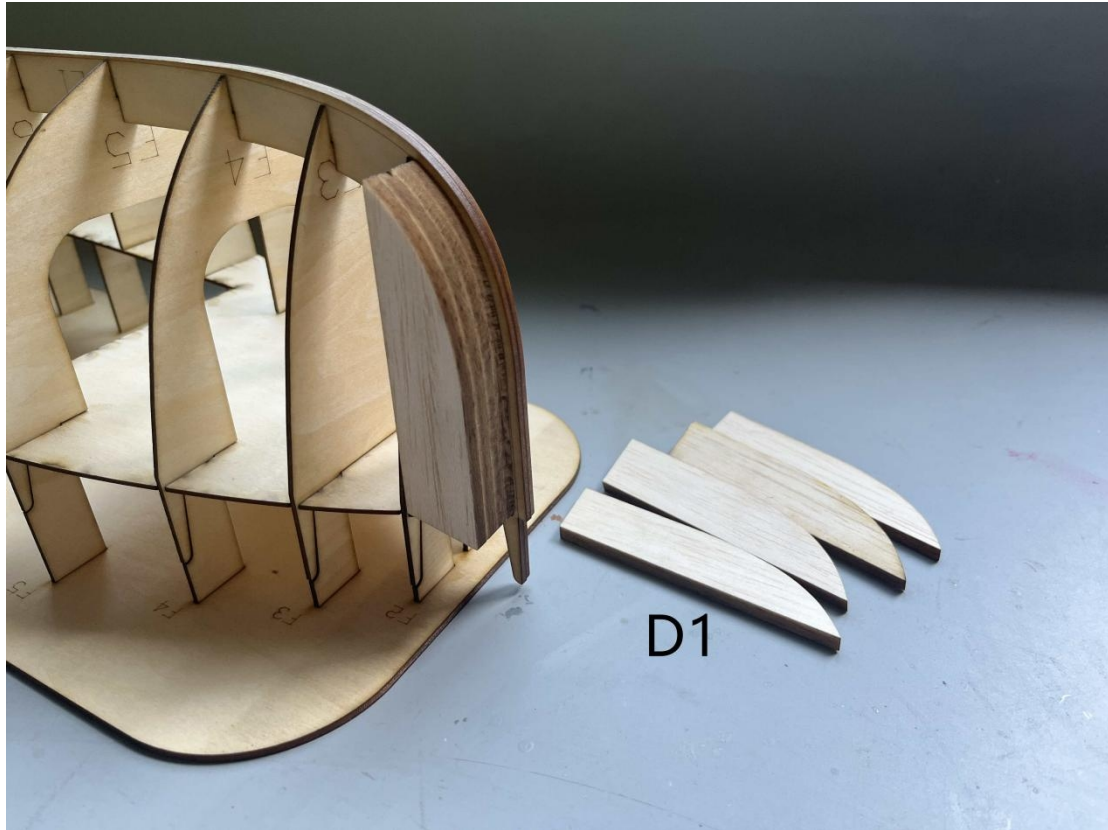
The keel is assembled from L1,L2,L3,L4



1.4



1.5 Install D1, D2, D3 and polish them



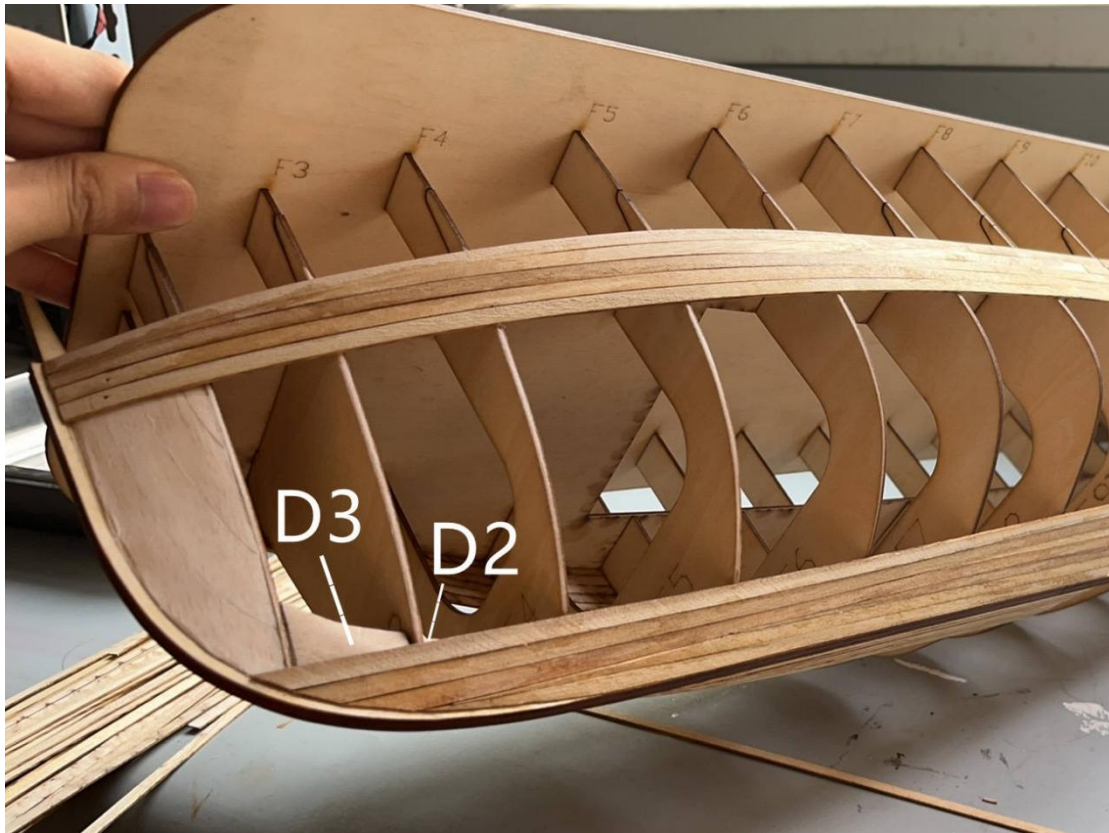
1.6



1.7



1.8



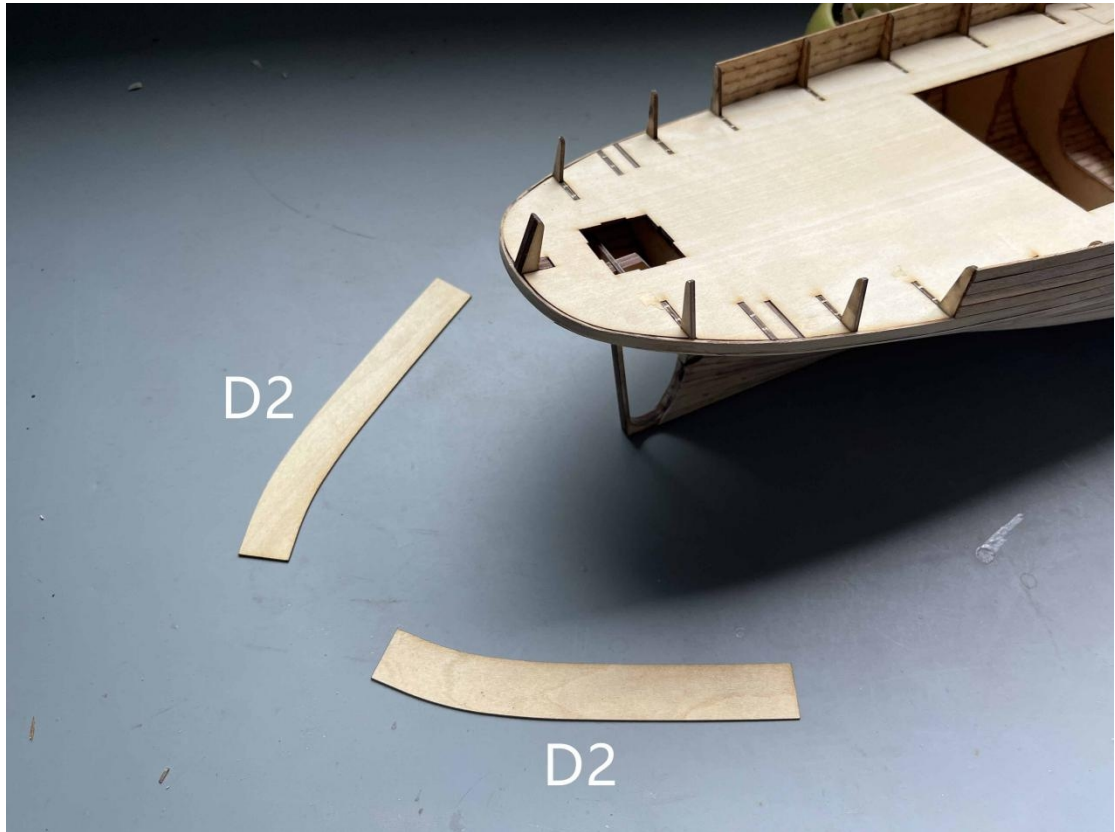
1.9



1.10 Remove the jigs



1.11



1.12



1.13 Install ABS half cylinder after Hull surface treatment. Heat it in advance to make it easier to bend



1.14



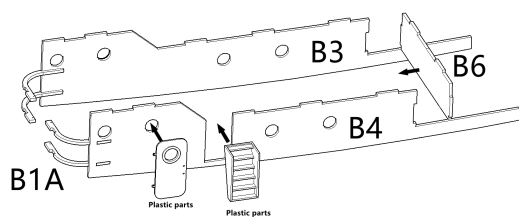
## ***Appendix: Hull surface treatment process***

### ***(For Reference only)***

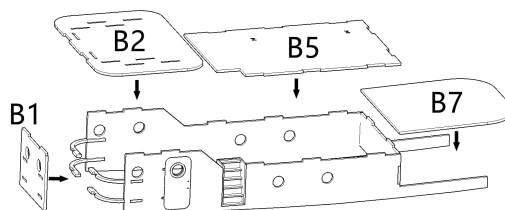
|       |                                                                                                                                                                   |
|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step1 | Sand the hull (Using sandpaper#180-#1000)                                                                                                                         |
| Step2 | Cover the hull with fiberglass cloth(0.03-0.1mm thickness)and apply epoxy resin                                                                                   |
| Step3 | Grinding and polishing the hull. (Needs water; Using sandpaper#180-#1000)                                                                                         |
| Step4 | Check the hull, if the wood is exposed due to the excessive sanding, we need repaint the epoxy resin to repair the exposed surface. The sand the patched surface. |
| Step5 | Spray primer on the surface                                                                                                                                       |
| Step6 | Wet-Polishing the surface                                                                                                                                         |
| Step7 | Repeat Steps5-6, Until you get a satisfactory surface                                                                                                             |

## Part2 - Deck building

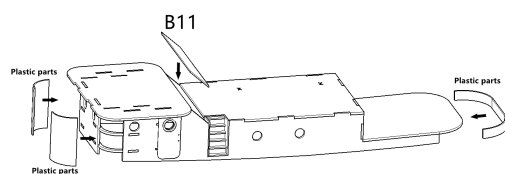
2.1



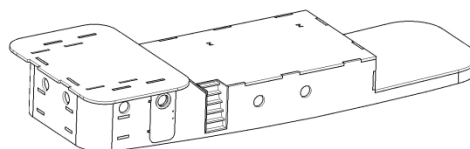
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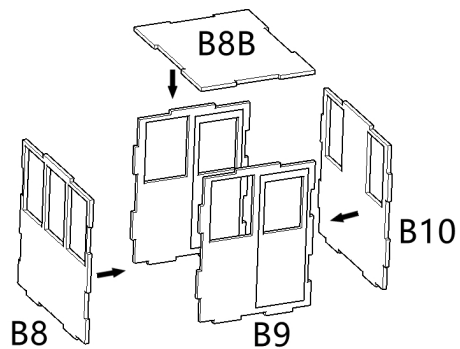
2.3



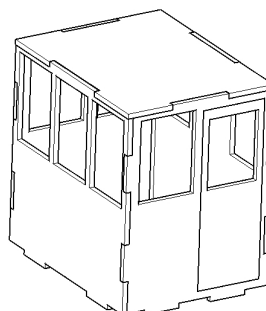
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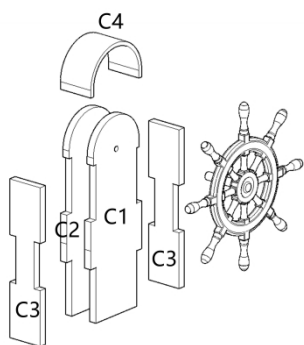
2.5



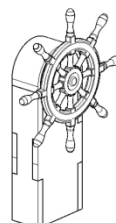
2.6



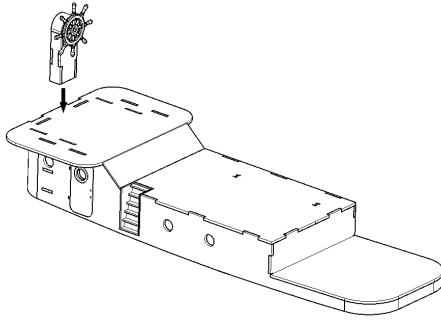
2.7



2.8



2.9



2.10



2.11



2.22 install the LED module



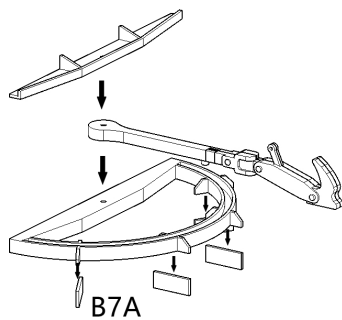
2.23



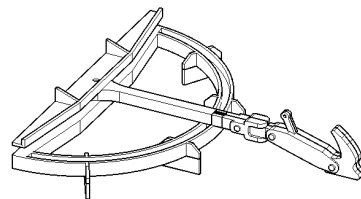
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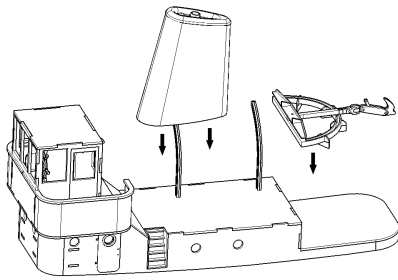
2.25



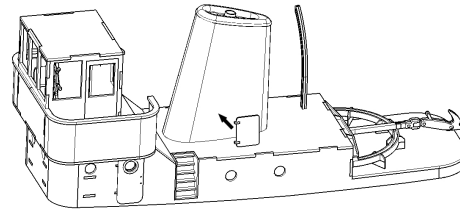
2.26



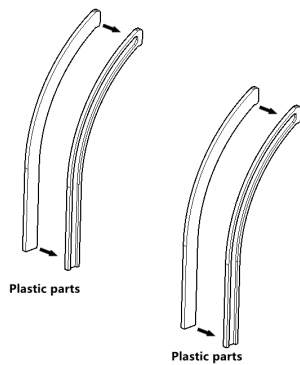
2.27



2.28 attach the hatch to the chimney



2.29



2.30



2.31



2.32



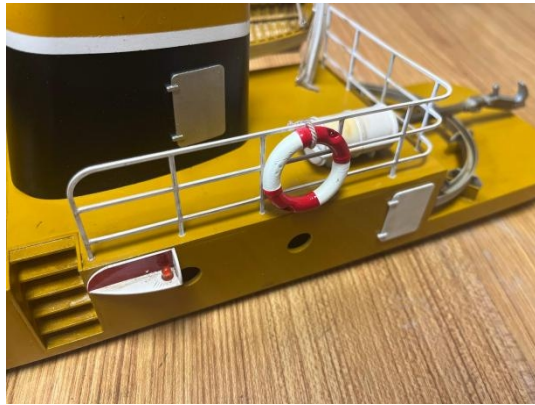
2.33 install the Rear railing, bend in advance, drill holes at 1.5mm diameter on the deck building to contain the railing feet.



2.34 install the ladder after the driving room



2.35 Tie the lifebuoy to the railing.



2.36 install the Copper bell



## Part3- Anchor Winch module

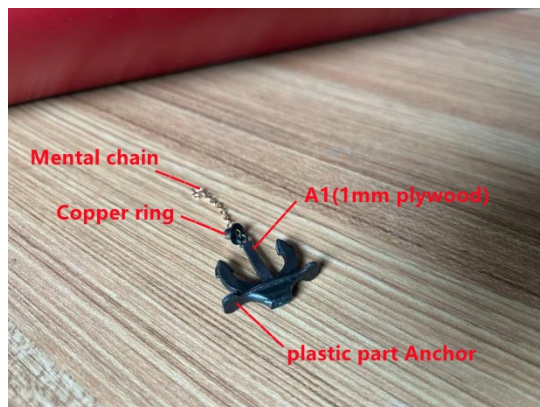
3.1



3.2



3.3

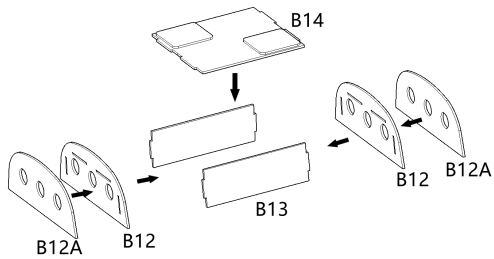


3.4

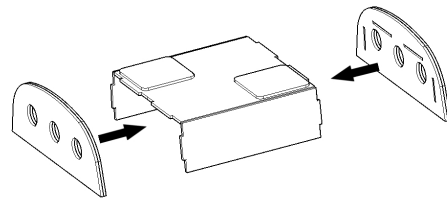


## Part4- Tool Box Room

4.1

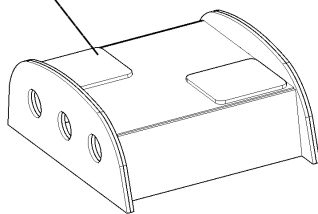


4.2

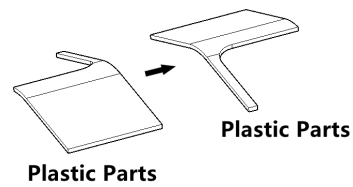


4.3

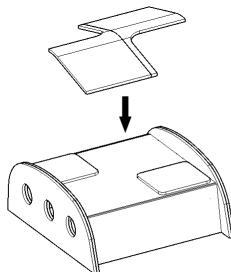
Plastic part, tool box room's hatch



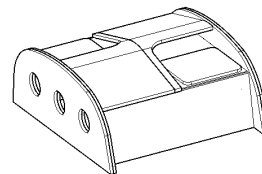
4.4 Roof-1 and roof-2



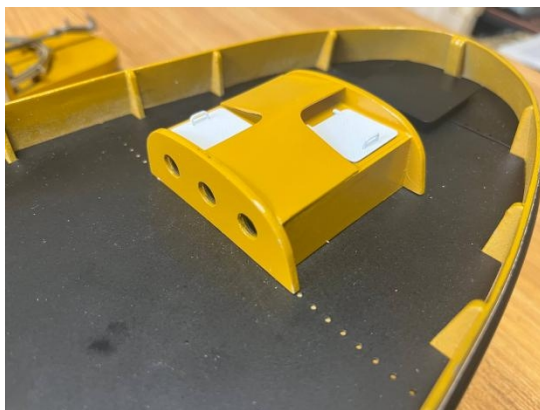
4.5



4.6



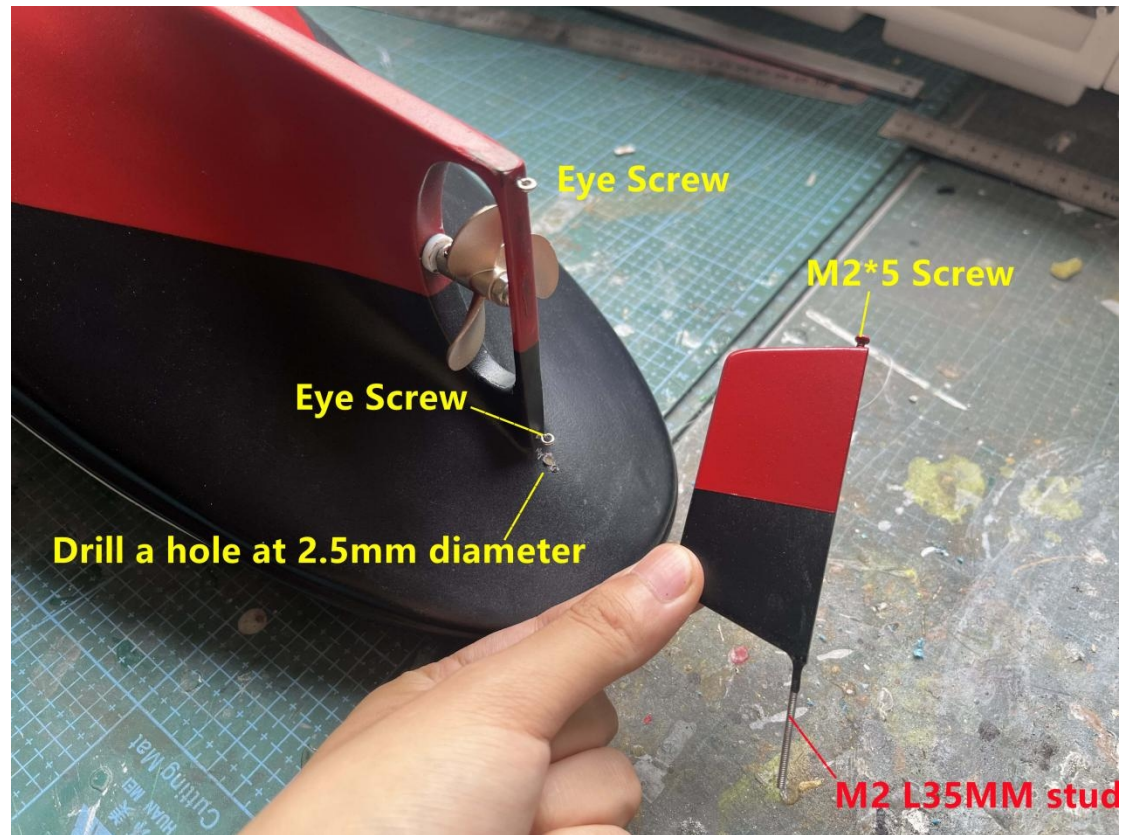
4.7



**Note: the handle on the hatch made of Copper Rod (Diameter :1mm)**

## Part5- Electronics

5.1



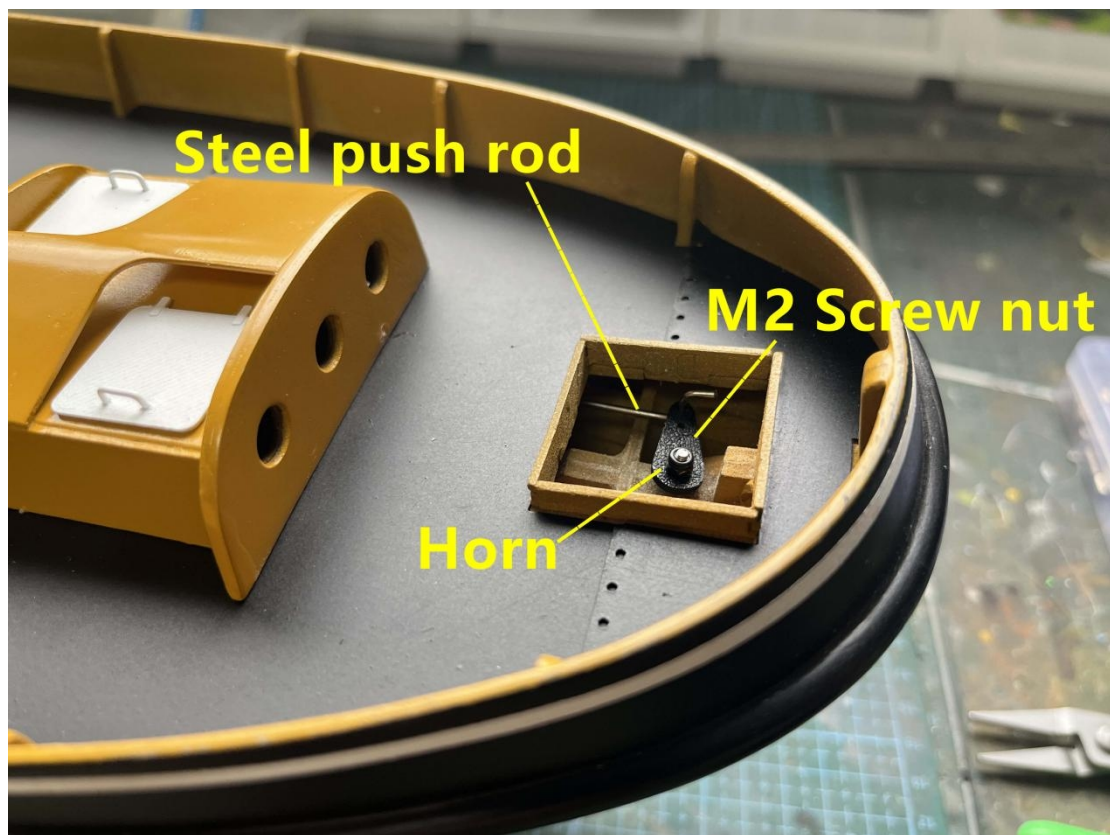
5.2



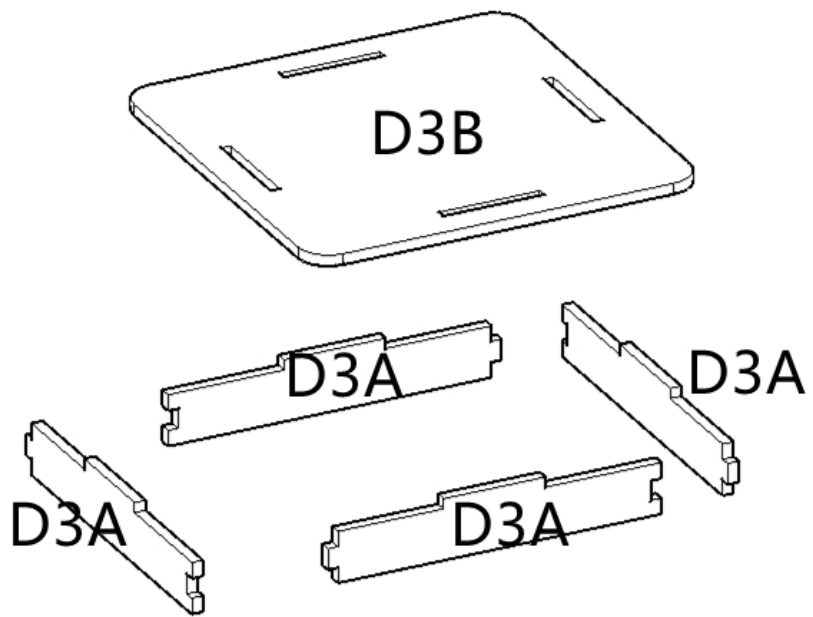
5.3



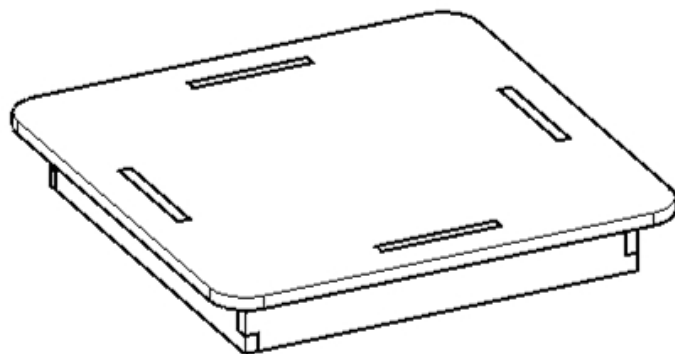
5.4



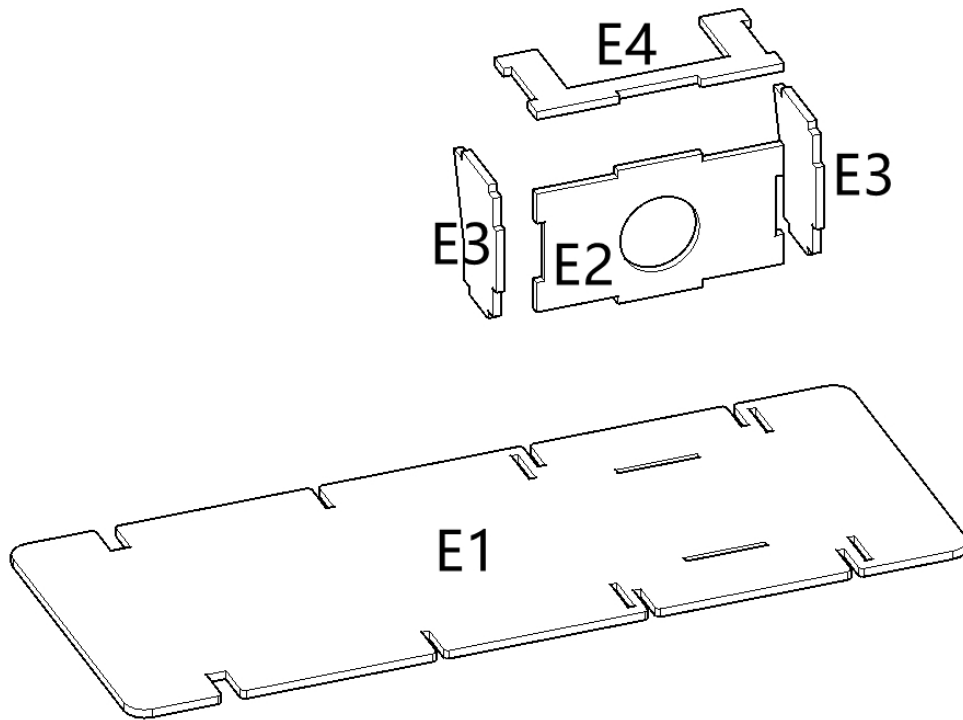
5.5 Rudder cabin hatch



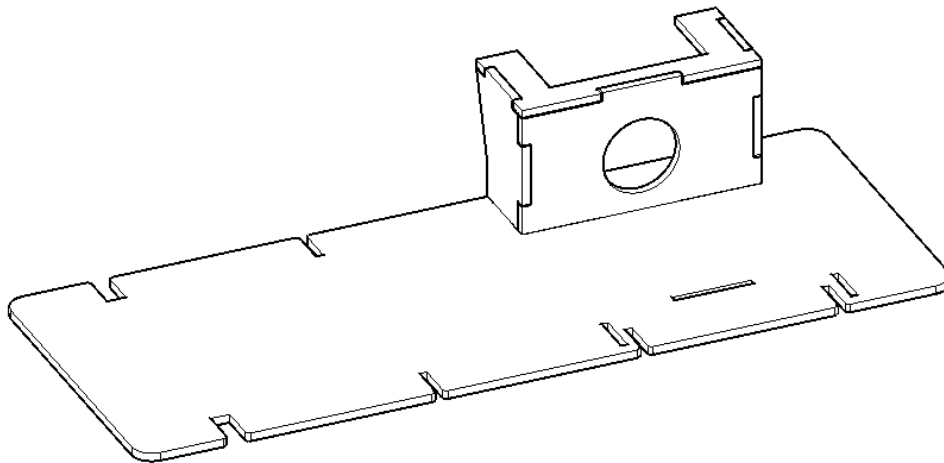
5.6



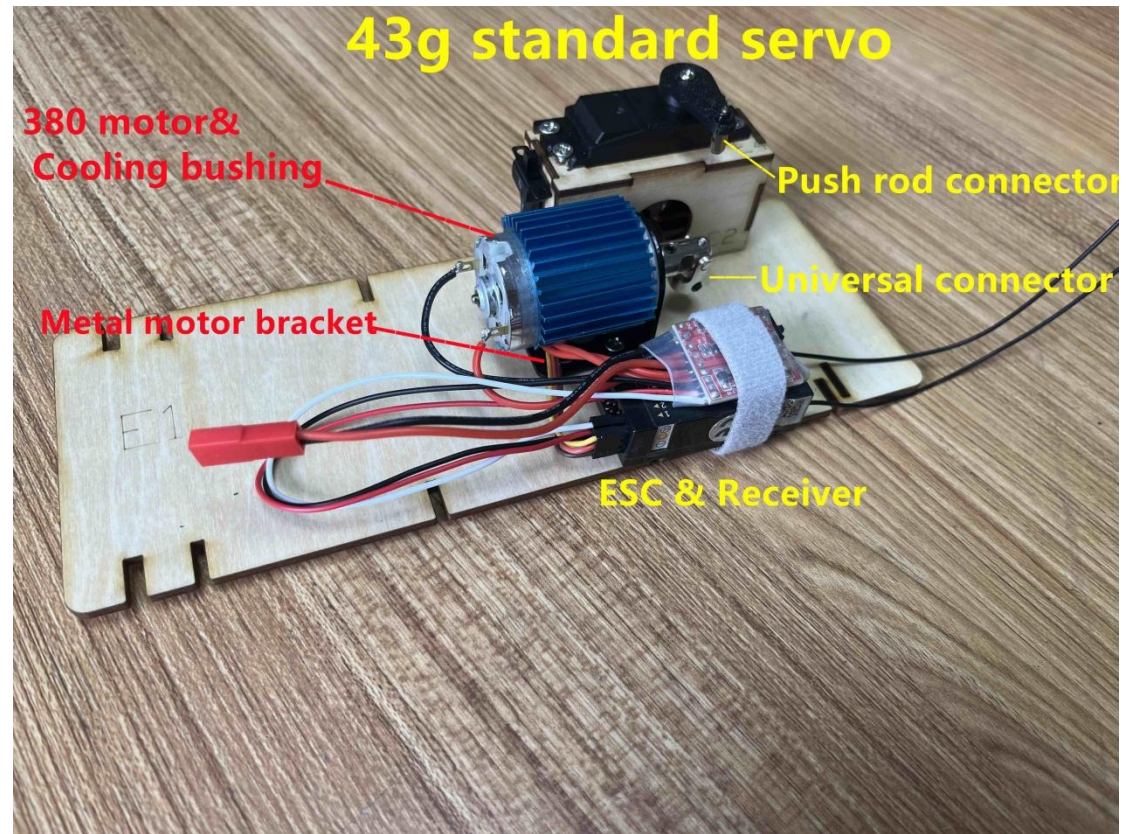
5.7 Electronics mounting bracket



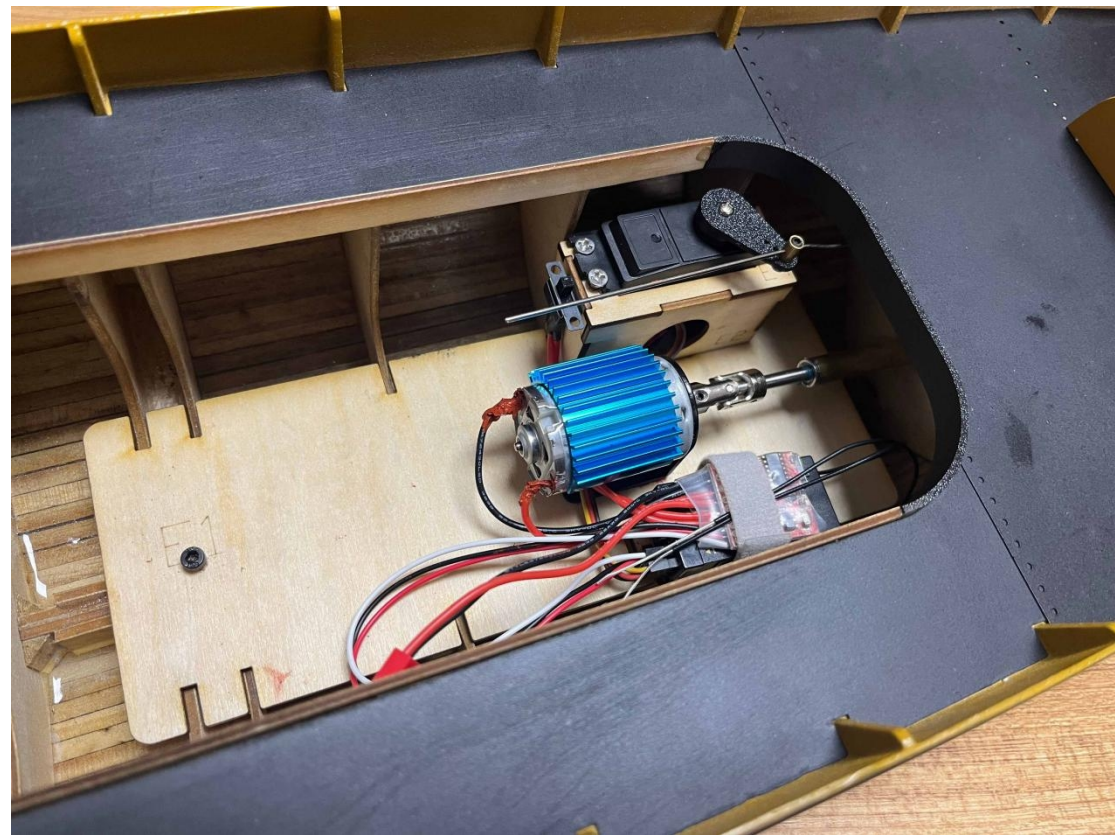
5.8



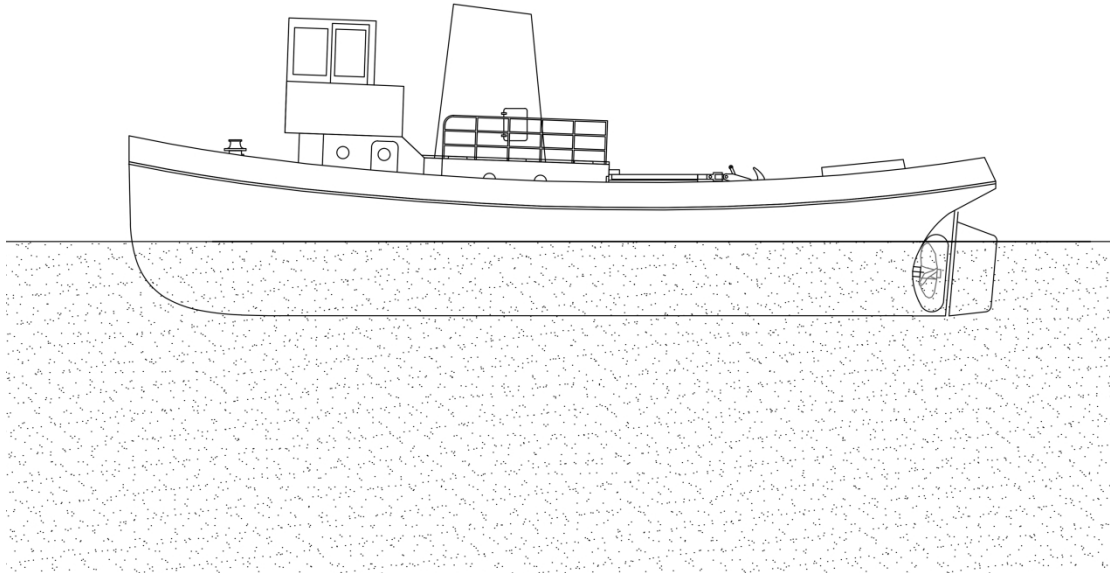
5.9



5.10



3.8 Waterline diagram. Before sailing, you need to add additional ballast to cabin.



***Thank you!***



**Tony Ray's AeroModel**